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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,292	04/02/2004	Henrik Lund	10444.500-US	2299

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EXAMINER	
KOSSON, ROSANNE	

ART UNIT	PAPER NUMBER
1653	

DATE MAILED: 09/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/817,292	Applicant(s) LUND ET AL.	
	Examiner Rosanne Kosson	Art Unit 1653	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14 (Group II)* is/are pending in the application.

4a) Of the above claim(s) *1-14 (Groups I and III-X)* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 (Group II)* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/2/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicants' election with traverse of Group II, claims 1-14, drawn to a method of treating paper making pulp comprising the steps of alkaline treatment, followed by pectate lyase treatment, in the reply filed on August 15, 2005 is acknowledged.

Groups I and III-X are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected inventions, there being no allowable generic or linking claim. No claims have been amended, added or canceled. Accordingly, the claims of Group II are examined on the merits herewith.

Regarding the restriction requirement, all of Applicants arguments have been considered, but they are not persuasive. Applicants note that some of the groups listed in the restriction requirement Office action are in the same class and subclass as the elected group and that, therefore, it would not be a serious burden if restriction were not required. In reply, the Office does not have an infinite number of subclasses for each class into which a particular set of processes is classified. Because the number and nature of the subclasses in each class is limited for practical reasons (the Office cannot anticipate the variety in the inventions for which applications are filed), different processes that are distinct inventions may fall into the same subclass. Additionally, particularly in biotechnology, inventions are not primarily searched by class and subclass. Also, as noted in the previous Office action, each invention requires its own

search and its own consideration of prior art issues, as well as issues under 35 USC §112, first and second paragraphs. Thus, the presentation of multiple inventions does impose a serious burden of search and examination. Applicants assert that claim 1 links the different inventions and that Applicants are required to redraft claim 1. In reply, the previous Office action does not require redrafting claim 1. Claim 1 is generic in that it recites that paper making pulp may be treated with pectin lyase or pectate lyase or pectate lyase plus pectinesterase. The comprising language allows step b) to be performed before or after step a). But the rejoinder of any claims not in Group II is subject to the allowance of claim 1 as written.

The restriction requirement is maintained and is made final.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 11 recites that the enzymes are added together with complexing agents and/or surfactants. Claim 1, from which claim 11 depends, recites only one enzyme in the claimed method, pectate lyase. More than one enzyme is not required. Appropriate correction is requested.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 10, 12 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanabe et al. ("On mechanism of enzymic maceration of bast fibers. II. Approach from aspect of fiber components," Shikoku Kogyo Gijutsu Shikensho Kenkyu Hokoku 15:63-88, 1988) with evidence provided by IUBMB Enzyme Nomenclature (Nomenclature Committee of the International Union of Biochemistry and Molecular Biology (NC-IUBMB), Web Version of Enzyme Nomenclature, record for pectate lyase, EC 4.2.2.2, http://www.chem.qmul.ac.uk/iubmb/enzyme/EC4/2/2/2.html, printed on August 29, 2005, "Enzyme Nomenclature"). Tanabe et al. disclose a process for treating paper making pulp in which fibers from birch wood, debarked wood, are treated with an alkaline solution (NaOH), drained, dried, and then incubated in the second process water with a mixture of pectate lyase and pectin lyase. The digested wood pulp is drained by filtration, and the filtrate is analyzed by anion exchange column chromatography (see pp. 64, 65, 78 and 79). Another drainage step occurs in the two-step pulping process, in which fibers treated with pectate lyase and pectin lyase for three hours are filtered and washed and treated with enzyme solutions for another six hours (see p. 79). With regard to claim 5, Enzyme Nomenclature discloses that the pectate lyase reaction produces unsaturated oligomers with a 4,5 carbon-carbon double

bond in the non-reducing terminal sugar residue (see enclosed diagram of pectin and pectate lyase reactions). Therefore, a holding of anticipation is required.

Claims 1-7, 10, 12 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Kobayashi et al. ("Approach to maceration mechanism in enzymatic pulping of bast fibers by alkalophilic pectionlytic enzymes produced by *Erwinia* species," Biotechnology Advances, (6):29-37, 1988). Kobayashi et al. disclose a process for treating paper making pulp in which fibers from birch wood, debarked wood, are treated with an alkaline (NaOH), drained, and then incubated in the second process water with an *Erwinia sp.* that secretes pectate lyase and pectin lyase. The digested wood pulp is drained again, washed and screened (see p. 32). The pectate lyase treatment leads to the formation of unsaturated oligomers with a 4,5 carbon-carbon double bond in the non-reducing terminal sugar residue, as measured in pectate lyase assays of various strains of Erwinia (see pp. 32-34). Therefore, a holding of anticipation is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 6-10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen et al. (US 6,284,524) in view of Thornton ("Enzymatic degradation of polygalacturonic acids released from mechanical pulp during peroxide bleaching," Tappi Journal 77(3):161-167, 1994). Thornton discloses a process of treating wood pulp (from spruce) for making paper in which the wood pulp, or thermomechanical pulp- TMP, is first treated with an alkaline peroxide bleaching solution (see p. 161, left col. and p. 163, right col.). This pulp suspension is drained through a filter, and pectinase is added to the filtrate (white water) (see p. 161 and 166, center cols.). Pectinase is added to degrade the polygalacturonic acids released from the TMP during bleaching (see p. 162, right col., and p. 166, center col.). The polygalacturonic acids, or anionic trash, in the white water form insoluble and colloidal complexes with calcium and aluminum salts that are also present, and these complexes interfere with processing of the pulp (see p. 161 and 164, right cols.). The TMP suspension to be treated with pectinase is also cleaned by removing noncolloidal fibers and fines by centrifugation (see p. 166 middle col.). Treatment of the white water with pectinase, compared to not adding a cleavage enzyme, reduces the cationic demand by

40% (see p. 163, Fig. 4 and right col.), thereby reducing the amount of these complexes that are detrimental to the paper making process.

Andersen et al. disclose that TMP may be treated with pectate lyase (see col. 3, lines 21-30, col. 14, lines 34-39, and claims 1-5), which is useful generally for degrading cellulosic materials that contain plant cells. The pectate lyase may be combined with other carbohydrate-degrading enzymes, such as pectinase (i.e., polygalacturonase) (see col. 14, lines 22-25, and col. 16, lines 52-67). It would have been obvious to one of ordinary skill in the art at the time that the invention was made to use the pectate lyase treatment step of Andersen et al. in the TMP treatment method of Thornton, instead of pectinase, because Andersen et al. disclose that pectate lyase, which also degrades pectin, has high plant cell wall degrading activity, cell walls containing a large amount of pectin (see col. 15, lines 1-10, and col. 16, lines 45-51). Treatment with pectate lyase is also useful for separating the components of plant materials, such as sugar and starch-rich materials, pulp and hulls (see col. 16, lines 58-67). Thornton teaches that the alkaline bleaching process of wood pulp produces anionic pectin (galacturonic acid polymers) that should be degraded with pectinase to improve wood pulp processing. Andersen et al. teach that pectin is efficiently degraded with pectate lyase. Therefore, a holding of obviousness is required.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen et al. (US 6,284,524) in view of Thornton ("Enzymatic degradation of polygalacturonic acids released from mechanical pulp during peroxide bleaching," Tappi Journal

77(3):161-167, 1994) and further in view of IUBMB Enzyme Nomenclature (Nomenclature Committee of the International Union of Biochemistry and Molecular Biology (NC-IUBMB), Web Version of Enzyme Nomenclature, record for pectate lyase, EC 4.2.2.2, http://www.chem.qmul.ac.uk/iubmb/enzyme/EC4/2/2/2.html, printed on August 29, 2005, "Enzyme Nomenclature"), and Back et al. (US 5,582,681). The teachings of Andersen et al. and Thornton are discussed above. Claim 5 recites that the pectate lyase treatment produces an unsaturated oligomer with a 4,5 carbon-carbon double bond in the non-reducing terminal sugar residue. As noted above, Enzyme Nomenclature discloses that the pectate lyase reaction produces unsaturated oligomers with a 4,5 carbon-carbon double bond in the non-reducing terminal sugar residue (see enclosed diagram of pectin and pectate lyase reactions).

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen et al. (US 6,284,524) in view of Thornton ("Enzymatic degradation of polygalacturonic acids released from mechanical pulp during peroxide bleaching," Tappi Journal 77(3):161-167, 1994) and further in view of Back et al. (US 5,582,681). The teachings of Andersen et al. and Thornton are discussed above. Claim 11 recites that the enzymes are added together with complexing agents and/or surfactants. Back et al. disclose that, for making recycled paper, when a surfactant is added along with a pulp-digesting enzyme, oils present in the reaction mixture are solubilized, and the resulting paper is softer, even though the fibers remain coarse. The interaction occurring among the fibers, the oils and the enzymes is enhanced (see col. 5, lines 43-60, and col. 6,

lines 11-32). It would have been obvious to one of ordinary skill in the art to add a surfactant along with pectinase, in the method of Thornton, or along with pectate lyase, in the method of Andersen et al., because Back et al. teach that the addition of a surfactant produces softer paper. Soft paper may be used to make a variety of more expensive products, such as tissues, toilet paper, paper towels and napkins, while coarse paper has much more limited uses, such as newsprint (see col. 1, lines 17-60).

In view of the foregoing, a holding of obviousness is required.

Double Patenting- Obviousness Type

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-14 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 6,284,524 (Andersen et al., "Andersen et al. I"), or claims 20 and 21 of U.S. Patent No. 6,187,580 (Andersen et al., "Andersen et al. II"), or claims 21, 23 and 24 of U.S. Patent No. 6,399,351 (Bjørnvad et al.) in view of Thornton ("Enzymatic degradation of

polygalacturonic acids released from mechanical pulp during peroxide bleaching," Tappi Journal 77(3):161-167, 1994). The teachings of Andersen et al. I and Thornton are discussed above. Andersen et al. I claim a method of treating cellulosic material, plant material or paper-making pulp comprising treating the material or pulp with a pectate lyase. Similarly, Andersen et al. II claim a method of degrading plant material or paper-making pulp comprising treating the material or pulp with a pectate lyase. Likewise, Bjørnvad et al. claim a method of treating cellulosic fibers and a method of degrading plant material or paper-making pulp comprising treatment with a pectate lyase. The instant application claims a method of treating paper-making pulp comprising treating the pulp with a pectate lyase. The comprising language of the instant claims does not exclude additional steps. As discussed above, Thornton discloses that is common in the paper-making industry to treat wood pulp with an alkaline bleaching solution before digesting the fibers with a lytic enzyme to start the breakdown of the plant material and release the carbohydrates. Consequently, because it would have been obvious to one of ordinary skill in the art of paper making to include a step of treating paper-making pulp with an alkaline solution before treating it with a pectate lyase, the instant claims define an obvious variation of the patented inventions. Therefore, a holding of obviousness type double patenting is required.

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosanne Kosson whose telephone number is 571-272-

2923. The examiner can normally be reached on Monday-Friday, 8:30-6:00, with alternate Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jon Weber, can be reached on 571-272-0925. The fax phone number for the organization where this application or proceeding is assigned is 571-272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rosanne Kosson
Examiner
Art Unit 1653

rk/2005-08-29

ROBERT A. WAX
PRIMARY EXAMINER